# Space-to-Space Communications System

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## Abstract

The Space-to-Space Communications System (SSCS) is an Ultra High Frequency (UHF) Time-Division-Multiple Access (TDMA) system that is designed, developed, and deployed by the NASA Johnson Space Center (JSC) to provide voice, commands, telemetry and data services in close proximity among three space elements: International Space Station (ISS), Space Shuttle Orbiter, and Extravehicular Mobility Units (EMU).

The SSCS consists of a family of three radios which are:

> Space-to-Space Station Radio (SSSR)
> Space-to-Space Orbiter Radio (SSOR)
> Space-to-Space Extravehicular Mobility Radio (SSER)

The SSCS can support up to five such radios at a time. Each user has its own time slot within which to transmit voice and data. Continuous Phase Frequency Shift Keying (CPFSK) carrier modulation with a burst data rate of 695 kbps and a frequency deviation of 486.5 kHz is employed by the system. Reed-Solomon (R-S) coding is also adopted to ensure data quality.

In this paper, the SSCS system requirements, operational scenario, detailed system architecture and parameters, link acquisition strategy, and link performance analysis will be presented and discussed.